Remarks/Arguments

The Office Action of June 18, 2007 has been reviewed and carefully considered. Claims 53-56 remain canceled without prejudice. Claims 1, 2, 9, 21, 27, 42, 44, 57, 59, 68 and 76 have been amended. Claims 1-52 and 57-81 are now pending in this application.

Reconsideration of the above-identified application, as herein amended and in view of the following remarks, is respectfully requested. It should be noted that the Applicants are not conceding in this application that the amended claims in their prior form are not patentable over the art cited by the Examiner, as the present claim amendments have been made only to facilitate expeditious prosecution of the application. The Applicants respectfully reserve the right to pursue these and other claims in one or more continuation and/or divisional patent applications.

A. Rejections under 35 U.S.C. 112, First Paragraph

1. Rejection on the ground that claims 1-52 and 57-81 purportedly fail to comply with the enablement requirement.

The Examiner has rejected claims 1-52 and 57-81 for failing to comply with the enablement requirement. Specifically, the Examiner has alleged that the Specification and claims fail to teach how to make and use a three-dimensional display device. The Applicants respectfully disagree. In support of the rejection, the Examiner has asserted that a three dimensional display of an image cannot be created by employing only a display screen and an aperture plate.

As is well known in the art, the natural ability to perceive depth is enabled by utilization of each eye to view an object from slightly different angles. Accordingly, a perceived three-dimensional image may be formed by providing different perspectives of a scene to each eye of a user (see, e.g., p. 15, lines 3-5). In one implementation of the present principles, a three dimensional codec file, such as a DXF file (compatible with AutoCAD), is formatted to display a series of unique angles of a view of a scene on different portions of a two-dimensional screen (see, e.g., Specification, p. 21, lines 12-17; Fig. 6, wherein the unique angles of view correspond to different shades on the screen). As illustrated in FIG. 6 of the Specification, an aperture plate may be disposed in front of a two-dimensional screen to generate multiple unique perspectives of a scene over different areas in front of the plate. For each viewing area, an aperture provides a view of one perspective of a scene while blocking the other scene perspectives (see, e.g., Specification, p. 11, lines 3-5, stating that an aperture may be a window through which only one dimension may be viewed at a particular angle).

For example, the areas between each of lines A-E in FIG. 6 correspond to unique angles of view. A right eye of a user positioned between lines A and B observes one unique perspective of a scene and a left eye of a user positioned between lines B and C observes another unique perspective of a scene. The perspective provided is dependent on an observer's position in front of the aperture (see, e.g., Specification, p. 15, lines 3-6; p. 17, lines 12-16).

Figures 3 and 4 better illustrate the provision of different perspectives to each eye of a user to form a three-dimensional image by employing an aperture plate and a display screen described above. As depicted in FIG. 4, an aperture may provide unique

perspectives displayed on different pixels of a display screen to each eye of an observer, thereby permitting the observer to perceive a three-dimensional image (see, e.g., Specification, p. 17, lines 12-14). The three-dimensional image perceived by an observer is composed of overlapping views provided by a plurality of apertures dispersed on an aperture plate (see, e.g., Specification, FIG. 15; FIGS. 16-17; p. 25, line 14 to p. 26, line 8, discussing a viewing volume of a 3D display). Accordingly, the Specification adequately describes how a three dimensional image may be created by employing a display screen and an aperture plate. Withdrawal of the rejection of claims 1-52 and 57-81 for failing to comply with the enablement requirement under 35 U.S.C. 112, first paragraph is respectfully requested.

Additionally, the Examiner has asserted that the Specification fails to teach how the frame rate of the display is capable of producing at least 8 viewing angles, as recited claim 12. The Examiner appears to be referring to claim 11, which recites: "[t]he three dimensional display device according to claim 1, wherein said display comprises a high frame rate video display device having a frame rate, wherein said display has a resolution capable of producing at least 8 different perspectives, each different perspective viewable from a different viewing angle." The claim specifically recites that the display resolution is capable of producing at least 8 different perspectives. The claim does not recite that the frame rate produces at least 8 viewing angles. Accordingly, the withdrawal of the rejection of claim 8 is respectfully requested.

The Examiner has also alleged that the Specification and claims fail to teach how the horizontal parallax may have "a viewable range up to 180 degrees" and a vertical parallax may have "a viewable operating range up to 180 degrees," as recited in various

claims. Specifically, the Examiner has stated that the "parallax of angular viewing the images for achieving stereoscopic image display cannot exceed the angle viewing difference between two eyes of the observer which is a very narrow angle. It is not clear the parallax needed for achieving stereoscopic is capable being viewed at 180 degrees. Such angle range will certainly not be able to achieve stereoscopic image display and viewing."

To clarify the meaning of the claims that recite the phrase "a viewable range up to 180 degrees," claim 28 will be referred to as an example. Claim 28 recites "[t]he three dimensional display device according to claim 21, wherein said horizontal parallax has a viewable operating range up to 180 degrees." One of ordinary skill in the art would interpret the parallax operating range to mean the viewing range along arcs located at fixed distances from the screen (see, e.g., Specification, p. 11, lines 5-10; p. 15, lines 5-12). The means by which this may be achieved is discussed at length below regarding the rejection of claims 1-52 and 57-67 on the grounds that they purportedly fail to comply with the written description requirement. As asserted by the Examiner, interpreting the horizontal parallax operating range to mean the parallax viewing angle between a person's eyes is clearly unreasonable. Accordingly, the claims reciting "a viewable range up to 180 degrees" are adequately supported by the Specification.

Claim 76 also stands rejected for failing to comply with the enablement requirement. The Examiner alleges that the Specification fails to teach how a hybrid screen is formed. At p. 20, lines 17-22, the Specification states that "[t]he display 16 is preferably a high frame-rate video display device, and may employ any of a variety of display technologies. Examples of these technologies would be: High-speed liquid crystal

display technology or Ferroelectric liquid crystal display (FLCD); Organic LED technology; Miniature LED technology, plasma, zero twist nematic LC; rear projection using multiple projectors or a DLP mirror chip (described below); or a hybrid projection system based on the combination of any of these technologies" (emphasis added). Furthermore, FIG. 14 illustrates an example of a hybrid screen, and is discussed on p. 21, lines 4-6: "a rear projection hybrid system using multiple LCD video projectors back lit by sequenced strobe lights being used as an alternative to a single high-speed display screen 16."

Thus, the term hybrid screen display, as recited in claim 76, is fully disclosed and taught in the specification in sufficient detail to permit one of ordinary skill in the art to make and use the claimed features. The Applicants, therefore, respectfully request the withdrawal of the Examiner's rejection of claim 76.

2. Rejection on the ground that claims 1-52 and 57-67 purportedly fail to comply with the written description requirement

The Examiner has also rejected claims 1-52 and 57-67 under 35 U.S.C. 112, first paragraph for failing to comply with the written description requirement. In support of the rejection, the Examiner has alleged that the feature of a display providing multiple perspectives of a perceived 3D image that is simultaneously viewable from multiple different user viewing angles included in several independent claims is not adequately described in the Specification.

Claim 1 now recites, inter alia: "the three dimensional display provides multiple different perspectives that form perceived 3D images simultaneously viewable from

respective multiple different user viewing angles." Additionally, the other independent claims also recite analogous features.

As stated above, with reference to FIG. 6, an aperture plate may be disposed in front of a two-dimensional screen to generate multiple unique perspectives of a scene over different areas in front of the plate. Firstly, FIGS. 4 and 6 illustrate that the different perspectives are provided simultaneously. Moreover, the Specification states that a user may view different perspectives simply by turning her head horizontally, clearly indicating that the perspectives are provided simultaneously (see, e.g., p. 17, lines 14-16).

It should also be noted that, as described above, a perceived three dimensional image is composed of two different unique angles of view, or perspectives. In addition, the different perspectives are simultaneously viewable in that different observers may view different perspectives provided by a 3D display device at the same time. For example, with reference to FIG. 6, a hypothetical observer may position her right eye between lines A and B and she may position her left eye between lines B and C. Because each eye views a unique perspective of a scene, a single perceived 3D image. At the same moment, a second user may view different perspectives by positioning herself in a different viewing area. For example, the second user may position her right eye between lines B and C and she may position her left eye between lines C and D so that each eye views a different unique perspective a scene. The second user thereby perceives a different 3D image simultaneously with respect to the first user's perception of a different 3D image. This effect is due to the simultaneous display of multiple different unique angles of view, as described in the Specification, and is readily ascertainable by one of ordinary skill in the art.

Thus, multiple perspectives that are simultaneously viewable from respective multiple different user viewing angles may be provided by a three dimensional display device to form 3D images in accordance with the present principles.

B. Claim Objections

1. Objection to the amendments filed on April 9, 2007 and September 22, 2006 under 35 U.S.C. 132(a).

Amendments to claims 1, 21, 42, 57 and 68 filed on April 9, 2007 and September 22, 2006 stand objected to under 35 U.S.C. 132(a) because they purportedly introduce new matter into the disclosure. Claim 1 now recites: inter alia: "the three dimensional display provides multiple different perspectives that form perceived 3D images simultaneously viewable from respective multiple different user viewing angles." Moreover, claims 21, 42, 57 and 68 also recite analogous features. As discussed above concerning the rejection of claims 1-52 and 57-67 in relation to the written description requirement, the Specification adequately describes the feature of providing multiple different perspectives that form perceived 3D images simultaneously viewable from respective multiple different user viewing angles. Thus, withdrawal of the objection is respectfully requested.

2. Objection to use of the word "perceived" in claims 1, 21, 27, 42, 47 and 57.

The Examiner has objected to claims 1, 21, 27, 42, 47 and 57 because the word perceived in the phrase "different perspectives of a perceived 3D image viewable from respective multiple different user viewing angles" is purportedly indefinite." To clarify the claims, the above recited phrase in claim 1 now reads "the three dimensional display provides

multiple different perspectives that form perceived 3D images simultaneously viewable from respective multiple different user viewing angles." The other claims objected to also recite analogous features. Thus, a perceived 3D image corresponds to any 3D image that a user perceives by viewing two unique perspectives provided by the display (see discussion provided above concerning the rejection of claims 1-52 and 57-67 in relation to the written description requirement). Moreover, the multiple different perspectives are simultaneously viewable from respective multiple different user angles, as described above.

3. Objection to use of the word "sequencing" in claim 2.

Claim 2 stands objected to because use of the word "sequencing" is purportedly confusing. Claim 2 has been amended in a way believed to overcome the objection. Support for the amendment may be found in the Specification at p. 10, lines 7-9; p. 12, line 12 to p. 13, line 21; and p. 16, lines 2-6. In addition, it should be noted that the sequencing of image portions on the display screen produces a perceived three-dimensional image, as the sequencing maintains a three-dimensional view during the scanning operation recited in claim 1, from which claim 2 depends, as described below (see also, e.g., Specification, p. 13, lines 11-21).

4. Objection to the words "produce" and "capable of" recited in claim 5.

The Examiner has objected to claim 5 on two grounds: an aperture plate will not "produce" slit apertures; and the word "capable of" is confusing. The Applicant respectfully disagrees.

Claim 5 recites, inter alia: "three dimensional display device according to claim 1, wherein said aperture plate is capable of producing vertical slit aperture openings having a slit width." An aperture plate may "produce" slit apertures. For example, as described in the Specification, an aperture plate may comprise a liquid crystal display parallax barrier that may include discrete active regions that may be switched from being opaque to being transparent by the application of an electrical current (see, e.g., Specification, p. 28, lines 6-9). The active regions may be configured to form silt apertures (see, e.g., Specification, p. 28, lines 9-20). Thus, an aperture may indeed "produce" slit apertures.

Moreover, the phrase "capable of producing vertical slit aperture openings having a slit width" is a distinct property of the aperture plate. The metes and bounds of the claim are easily determinable by one of ordinary skill in the art. The phrase clearly describes an aperture plate that is readily adaptable to produce slit apertures. For example, the liquid crystal display parallax barrier described above may be readily adaptable to form aperture slits. Accordingly, withdrawal of the objection of claim 5 is respectfully requested.

5. Objection to claim 9

The Examiner has objected to claim 9, asserting that the claim "is wrong." The Examiner states that "[i]f the aperture plate has number of apertures that equals the number of the number of the pixels then the aperture plate essentially has no function, since all of the image light from all of the pixels will just pass through the aperture plate and no three-dimensional display will be achieved." The grounds of the objection are unclear, as the Examiner seems to object to the substance of the claim rather than its form. In any event, the claim has been amended in a way believed to overcome the objection. Support for the

amendment may be found in the Specification at p. 28, lines 6-20 and p. 21, line 22 to p. 22, line 7. Withdrawal of the objection is respectfully requested.

6. Objection to the phrases "solid state scan type" and "solid state type"

The Examiner has objected to use of the phrases "solid state scan type" and "solid state type," alleging that the word "type" is indefinite. It should first be noted that "solid state type" is not recited in any of the claims. In addition, while the Applicants acknowledge that in some circumstances, use of the word "type" in claims may be indefinite, "solid state scan type" is not indefinite, as it is specifically defined in the Specification. The Applicants direct the Examiner's attention to p. 36, line 10 to p. 37, line 4 of the Specification, wherein solid state scan type aperture plates are discussed. The Specification defines a "scan type" as "the means by which an aperture is rapidly translated across a viewer's field of view" (Specification, p. 36, lines 11-2). Moreover, the Specification also describes solid state scan type aperture plates as being scan type aperture plates that do not have moving parts and provides examples of solid state scan type aperture plates (see, e.g., p. 36, line 14 to p. 37, line 4). Accordingly, the term "solid state scan type" does not render claims reciting the term indefinite. Withdrawal of the objection is respectfully requested.

7. Objection to claim 41

Claim 41 stands objected to because the phrase "a number of vertical viewing angles is less than a number of viewing angles" is purportedly confusing. Firstly, claim 41 states that "a number of vertical viewing angles is less than a number of horizontal viewing

angles" (emphasis added). The claim simply refers to the configuration of a three-dimensional display in which the number of discrete viewing angles in the vertical direction is less than the number of discrete angles in the horizontal direction (see, e.g., Specification, p. 23, lines 9-22). In view of the written description, one of ordinary skill in the art would readily understand the meaning of claim 41. Thus, withdrawal of the objection is respectfully requested.

8. Objection to "a hybrid screen," recited in claim 76

The Examiner has objected to claim 76, asserting that the term "hybrid" in the phrase "hybrid screen" is indefinite. Use of the term "hybrid" does not render claim 76 indefinite, as its meaning is clear in light of the Specification. As discussed above, the Specification states that "[t]he display 16 is preferably a high frame-rate video display device, and may employ any of a variety of display technologies. Examples of these technologies would be: High-speed liquid crystal display technology or Ferroelectric liquid crystal display (FLCD); Organic LED technology; Miniature LED technology, plasma, zero twist nematic LC; rear projection using multiple projectors or a DLP mirror chip (described below); or a hybrid projection system based on the combination of any of these technologies" (emphasis added) (Specification, p. 20, lines 17-22). Furthermore, FIG. 14 illustrates an example of a hybrid screen, which is discussed on p. 21, lines 4-6: "a rear projection hybrid system using multiple LCD video projectors back lit by sequenced strobe lights being used as an alternative to a single high-speed display screen 16."

In addition, it should be noted that one of ordinary skill in the art would interpret "hybrid screen display," as recited in claim 76, to be equivalent to a "hybrid projection

system," as recited in the Specification. As is known in the art, the term "screen" is commonly applied to many of the listed display technologies that may compose a hybrid projection system. Accordingly, the term "hybrid screen display" is not indefinite. Withdrawal of the objection is respectfully requested.

9. Objection to the phrase "capable of" as recited in claim 11

The Examiner states that "[t]he phrase 'capable of' recited in various claims is confusing and indefinite", and cites *In re Hutchison* for the proposition that use of the term capable of prevents patentability. However, under *Hutchison* and its progeny, the use of a term describing the configuration or capabilities of an element does not automatically bar the patentability of the claim. As long as the metes and bounds of the claim may be ascertained, the claim is definite enough for patentability.

Here, the use of the term "capable of" describes the resolution of the three-dimensional display being capable of displaying at least 8 viewing angles. The claim uses the term "capable of" in such a way as to describe the limitations of its elements. "[C]apable of displaying at least 8 viewing angles" is a distinct property of a display, the metes and bounds of the elements are easily determinable.

Applicant, therefore, respectfully requests the withdrawal of the Examiner's objection to the use of the term "capable of."

C. Rejections under 35 U.S.C. 103(a)

Prior to addressing the Examiner's rejections under 35 U.S.C. 103(a), the Applicant will briefly summarize aspects of the present principles to better assist the Examiner in

appreciating the differences between claimed features and the references cited. As described above, in accordance with one aspect of the present principles, many unique viewing angles, or discrete angles, may be provided by employing an aperture plate (see, e.g., Specification, FIG. 4; p. 17, lines 12-16). The number of discrete viewing angles encountered per unit length on an observer plane (see, e.g., Specification, FIG. 4), as referred to herein, define an "Angular Resolution" (see Specification, p. 17, lines 4-6).

Increasing the distance between open apertures may increase the number of discrete angles observed over a given area (see, e.g., Specification, p. 11, line 20 to p. 12, line 5, stating that there is a direct relationship between angular resolution and the distance between apertures). Because a larger area of a display screen at a particular viewpoint is blocked upon increasing opaque areas of an aperture plate (i.e., distance between apertures), the blocked area may be used to display additional unique perspectives of a scene on the display screen that are viewable at other points on an observer plane (see Specification, FIG. 4). As discussed above, a three-dimension image is formed by presenting different perspectives of a scene to each eye of a user, while blocking other perspectives from each eye. Presenting many discrete views mimics a realistic perception of a three dimensional object when an observer slightly changes her position with respect to the display. Thus, it is desirable to provide very large opaque areas on an aperture plate to present as many discrete views as possible.

However, in a static aperture plate, the distances between open apertures, or, likewise, the size of opaque areas, are limited by the resolution of the human eye. For example, if the distances between open apertures are too great, the screen would appear as a series of discrete dots against a black background (see, Specification, p. 11, line 20 to p.

12, line 5). Thus, because the size of the opaque areas on a static aperture plate is limited, the number of discrete viewing angles is also limited due to their direct relationship, as described above.

According to an aspect of the present principles, a large number of discrete viewing angles may be provided to form a holographic display. In one implementation of the present principles, the resolution limitation described above is overcome by employing a scanning aperture plate. The scanning aperture plate may comprise, for example, a high speed liquid crystal display shuttering system (see, e.g., Specification, p. 20, lines 5-12). Figures 12 and 13 of the Specification provide an illustrative example of an aperture plate in which open and closed shutter pin holes act as open apertures and opaque areas, respectively.

In one aspect of the present principles, the scanning aperture plate utilizes a "persistence of vision" property of sight. "Persistence of Vision" is defined in the specification as "a property of human vision that causes it to interpret many brief visual states as a single or continuous perceived visual state" (Specification, p. 12, lines 12-14). Thus, a row of sequentially flashing lights may appear to glow simultaneously if each light's flash rate is above an observer's "persistence of vision" threshold (see, e.g., Specification, p. 12, lines 15-17). As recited in the specification, the persistence of vision property has been found to apply to the viewing of light through shuttered or moving apertures (see, e.g., Specification, p. 12, lines 18-19).

Thus, scanning an open aperture over an area may generate the illusion that opaque areas of an aperture plate are transparent (see, e.g., Specification, p. 13, lines 5-13). Figure 15 provides an example of a configuration of an aperture plate utilizing the persistence of

vision property of sight described above. The depiction provided in FIG. 15 corresponds to a distinct moment in time. Each open aperture scans a region delineated by the dotted line to create the illusion that the opaque regions are transparent.

The illusion permits the employment of larger opaque areas on an aperture plate at any particular moment, thereby enabling the provision of an increased number of discrete views to form a holographic display. In addition, a three dimensional display, provided by the apertures as described above, may be maintained throughout the scanning process by changing, or sequencing, the images displayed on the display screen accordingly (see Specification, p. 13, lines 13-21). Therefore, by employing a scanning aperture plate in accordance with an aspect of the present principles, a number of discrete views of a scene forming a holographic display may be provided to an observer, despite employing large opaque areas of an aperture plate that would otherwise be perceptible under normal viewing conditions.

Claim 1 of the present application includes some of the aspects of a scanning aperture in accordance with the present principles, as discussed above. Specifically, claim 1 recites, inter alia: "an aperture plate including apertures and opaque areas formed by closed apertures between open apertures that is disposed in front of said display screen; wherein the aperture plate is configured such that the open apertures scan the aperture plate to generate an illusion that the opaque areas are transparent." Support for these features of claim 1 has been cited at length above. Additionally, all of the other independent claims, 21, 42, 57, 68 and 76, also include features analogous to those quoted above with regard to the scanning operation recited in claim 1.

1. Rejection of claims 1-20 under 35 U.S.C. 103(a) on the grounds that claims 1-20 are unpatentable over Harrold

By the office action, claims 1-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Harrold, et al., (U.S. Patent No. 5,969,850) (hereinafter 'Harrold').

Harrold discloses a three dimensional display system employing a display screen (see, e.g., Harrold, Fast SLM 1, FIG. 34) and a fast switching dynamic parallax barrier 2 (see, e.g., Harrold , FIG. 34; column 12, lines 26-29). As illustrated in FIG. 34, for example, the Harrold system may be spatially and temporally multiplexed (see, e.g., column 12, lines 52-56), wherein the apertures of the parallax barrier may be alternately turned on or off to provide two three dimensional views corresponding to windows 72 & 73 and 74 & 75, respectively. The apertures at one moment are configured to display images for the left eyes of the observers, field 1, and at the next moment to provide images of a different perspective to the right eyes of the observers, field 2. Thus, the apertures alternately turn on and off to provide two three-dimensional views.

However, the apertures do not scan areas of the aperture plate to create the illusion that opaque areas of the aperture plate are transparent. As stated above, the alternating apertures of Harrold merely provide different views to each eye of the observer. The time multiplexing of the apertures as described in Harrold does not create the illusion that opaque areas of the aperture screen are transparent. Indeed, Harrold does not discuss the perceptibility of the opaque regions of its parallax barrier at all. The only reasonable interpretation of Harrold is that the opaque regions are concealed in accordance with methods that are well known in the art; namely, that the opaque regions are small enough

that they are below the threshold of resolution perceptibility of the human eye, as described above.

In contrast, the open apertures of an aperture plate of a three-dimensional device in accordance with the present principles "scan [a] display screen to generate an illusion that the opaque areas are transparent," as recited in claim 1. This feature permits the display of a multitude of discrete viewing angles to provide a three-dimensional holographic display. Employing apertures to generate an illusion that opaque areas of an aperture plate are transparent by scanning a display screen is not disclosed or even remotely suggested by Harrold. Accordingly, the description of the three dimensional device in Harrold does not render claim 1 obvious. Thus claim 1 is believed to be patentable over Harrold. In addition, claims 2-20 are also believed to be patentable over Harrold due at least to their dependencies on claim 1.

2. Rejection of claims 21-52 and 57-81 under 35 U.S.C. 103(a) on the grounds that claims 21-52 and 57-81 are unpatentable over Aritake in view of Harrold in further view of Isono.

The Examiner has also rejected claims 21-52 and 57-81 under 103(a) as being unpatentable over Aritake et al. (U.S. Patent No. 6,061,083) (hereinafter 'Aritake') in view of Harrold in further view of Isono et al. (U.S. Patent No. 5,315,377).

Aritake discloses a three-dimensional display system that provides multiple perspectives of an object over several different viewing windows (see, e.g., Aritake, FIGS. 32-34). The Aritake system includes a display screen and a parallel scanning part, which distributes multiple perspectives provided on the display over the different viewing areas

(see, e.g., Aritake, FIGS. 32-34). In accordance with an aspect of the system described in Aritake, a scanning portion may comprise a liquid crystal shutter mechanism (see Aritake, FIGS. 42, 43A and 43B). The liquid crystal shutter mechanism includes slips that alternately transmit and block light emanating from image elements of a display device (see Aritake, column 22, lines 41-44). The shutter corresponding to each image displayed is alternately opened to project each image on a lenticular lens, which deflects the images to their corresponding viewing windows (see Aritake, FIGS. 32C, 42, 43A and 43B; column 22, lines 41-65).

The scanning operation of Aritake does not generate an illusion that opaque areas on the LCD shutter mechanism are transparent. As described above, the slips of the shutter mechanism merely act to filter images that are dispersed by a lenticular lens. Moreover, Aritake discloses that opaque areas of the shutter mechanism are concealed by a method completely different from the present principles. Aritake discloses configuring the distance between image elements to be less than the resolution of the human eye (see Aritake, column 18, lines 42-46). Nowhere does Aritake describe or remotely suggest that concealment of opaque areas is achieved by scanning the slips on the LCD shutter mechanism.

In addition, Isono also fails to disclose generating an illusion that opaque areas on an aperture plate are transparent by scanning the apertures. Isono discloses providing up to six different perspectives of a scene on a viewing plane by employing two transmitting liquid crystal display screens (see, Isono, FIG. 4; column 4, lines 11-12). The first LCD screen displays six consecutive image elements corresponding to different perspectives of an object over areas of the screen (see, Isono, FIG. 4; column 9, line 66 to column 10, line

11). The image elements are dispersed by apertures of a second display device that is positioned in front of the image area on the first LCD screen to provide six different viewpoints on an observer plane (see Isono, FIG. 4; column 10, lines 11-23). Isono also discloses that the apertures may be shifted to follow the movement of an observer so as to maintain an observer's view (see Isono, column 11, lines 35-58).

However, Isono does not disclose scanning the apertures in a transmitting LCD screen to conceal the opaque portions of the screen (e.g., 5B in FIG. 4). As stated above, the apertures are shifted to follow the movement of an observer. Moreover, the three-dimensional images displayed by the system of Isono are viewable when the apertures are still. Thus, movement of the apertures simply does not conceal opaque portions of the screen. Accordingly, Isono fails to disclose or remotely suggest generating an illusion that opaque areas on an aperture plate are transparent by scanning the apertures.

Furthermore, as discussed at length above, Harrold also fails to disclose or remotely suggest scanning apertures of an aperture plate to generate an illusion that opaque areas on an aperture plate are transparent.

Claims 21, 42, 57, 68 and 76 include the feature of scanning a display with open apertures to generate an illusion that opaque areas of the display are transparent. Thus, claims 21, 42, 57, 68 and 76 are not anticipated or rendered obvious by Aritake, Isono, and Harrold, taken singly or in any combination, as the references are not even remotely related to scanning a display to generate an illusion that the opaque areas of the display are transparent. Additionally, claims 22-41, 43-52, 58-67, 69-75, and 77-81 are not anticipated or rendered obvious by the references due at least to their respective dependencies on claims 21, 42, 57, 68 and 76.

3. Rejection of claims 1-20 under 35 U.S.C. 103(a) on the grounds that claims 1-20 are unpatentable over Isono.

Claims 1-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Isono.

Claims 1-20 are patentable over Isono for at least the reasons recited above. Claim 1 includes, inter alia: "an aperture plate including apertures and opaque areas formed by closed apertures between open apertures that is disposed in front of said display screen; wherein the aperture plate is configured such that the open apertures scan the aperture plate to generate an illusion that the opaque areas are transparent." As discussed above, Isono fails disclose or render obvious the feature of scanning apertures over an aperture plate to generate an illusion that opaque areas of the aperture plate are transparent. Accordingly, claim 1 is believed to be patentable over Isono. Moreover, claims 2-20 are believed to be patentable over Isono due at least to their dependencies on claim 1.

4. Rejection of claims 21-52 and 57-81 under 35 U.S.C. 103(a) on the grounds that claims 21-52 and 57-81 are unpatentable over Isono in further view of Aritake.

Claims 21-52 and 57-81 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Isono in further view of Aritake.

Claims 21-52 and 57-81 are patentable over Isono for at least the reasons recited above. Claims 21, 42, 57, 68 and 76 include the feature of scanning a display with apertures to generate an illusion that opaque areas of the display are transparent. As discussed above, Isono and Aritake, taken singly or in combination, do not disclose or

render obvious the feature of scanning apertures over a display to generate an illusion that the opaque areas of the display are transparent. Accordingly, claims 21, 42, 57, 68 and 76 are believed to be patentable over Isono and Aritake. Furthermore, claims 22-41, 43-52, 58-67, 69-75, and 77-81 are believed to be patentable over Isono and Aritake due at least to their respective dependencies on claims 21, 42, 57, 68 and 76.

Conclusion

Based on the foregoing discussions and clarifications, reconsideration and withdrawal of the rejections is respectfully requested, and the application be passed to allowance, and letters patent issued in due course.

In the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicant's representatives Deposit Account No. 50-1433.

Respectfully submitted,
KEUSEY, TUTUNJIAN & BITETTO, P.C.

John G. Tutunjian
(Reg. No. 39, 405)
20 Crossways Park North, Suite 210
Woodbury, NY 11797
Tel: (516) 496-3868

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